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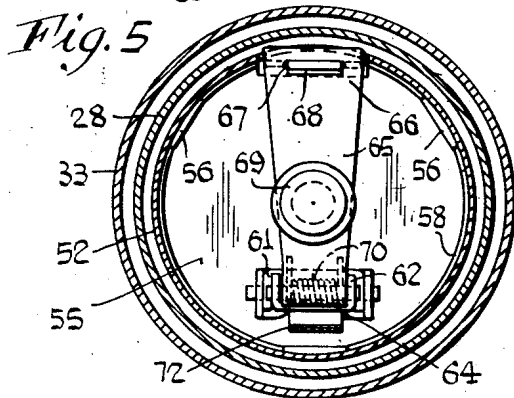
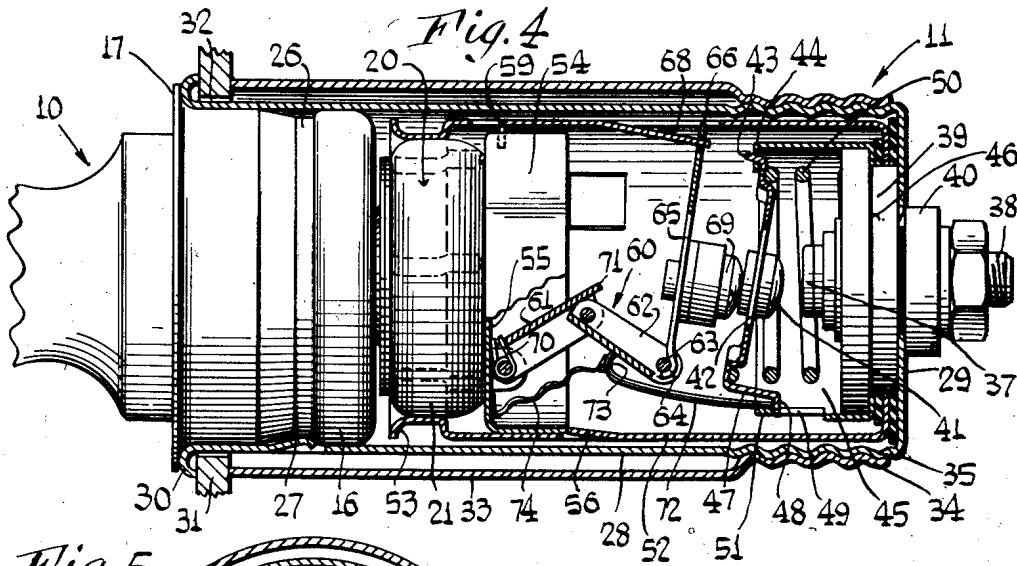
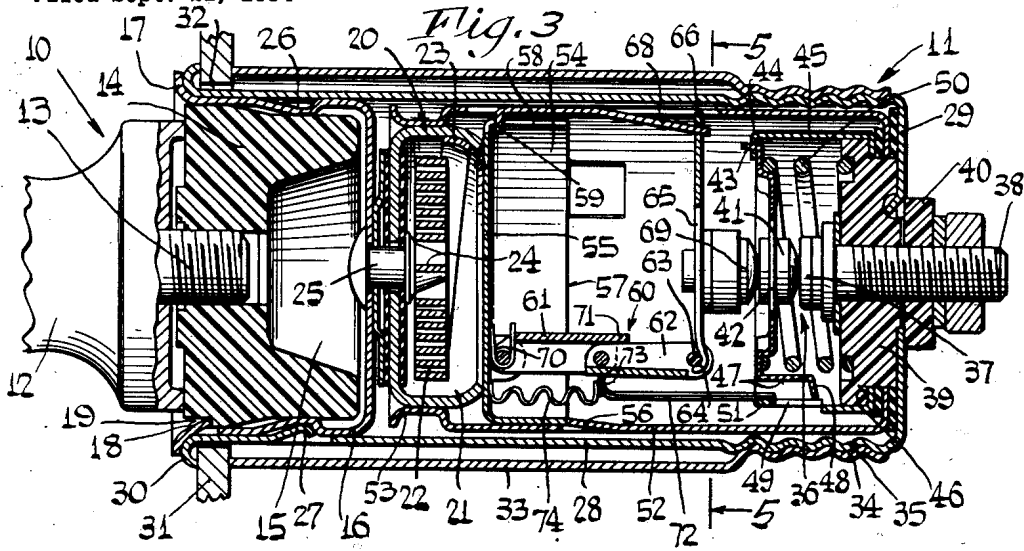
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ELECTRIC CIGAR LIGHTER.

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1

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ELECTRIC CIGAR LIGHTER

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11 Claims. (Cl. 219—32)

This invention relates to electric cigar lighters, and more particularly to electric cigar lighters of the type used in automobiles and other vehicles, wherein an igniting unit having a heating element is removably carried by a holding device.

An object of the invention is to provide an improved electric cigar lighter of the above type, which is virtually instantaneous in becoming fully heated by the energizing current when it is made operative.

Heretofore, electric cigar lighters were so organized and constructed that they usually required a heating period or interval of from 10 to 15 seconds, to enable the heating coil to attain proper incandescence for use. The cigar lighter of the present invention, however, is adapted to attain incandescence in a matter of two to four seconds, and I consider this very short interval to be "virtually instantaneous," as compared with the relatively large 10 to 15 second intervals of prior lighters.

A further object of the invention is to provide an improved quick-acting or quick-heating lighter as above set forth, which heats fully and to the proper incandescence a sufficiently large mass so that there is prolonged retention of the heat while the igniting unit is being passed around in use.

A still further object of the invention is to provide an improved quick-acting lighter as above characterized, wherein the possibility of the heating coil burning out from overenergization is greatly minimized if not wholly eliminated.

Another object of the invention is to provide an improved quick-acting cigar lighter in accordance with the above, which is simple in construction, relatively small and compact, has comparatively few parts, and is economical to manufacture and reliable in use.

A single embodiment of the invention, that at present preferred, is shown herein; however it should be understood that the invention is not limited to the specific details illustrated and described, since it has advantage and utility in connection with other cigar lighter constructions.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is an axial sectional view of a cigar lighter embodying the invention, with the igniting unit shown in deep, storage (inoperative) position.

Fig. 2 is a view like Fig. 1 but with the igniting unit shown in a shallow position, to which it has been moved preparatory to its being energized.

Fig. 3 is a view like Figs. 1 and 2, showing the igniting unit returned to its deep position, the parts of the cigar lighter now being set for energization of the heating coil.

Fig. 4 is another axial sectional view showing the parts of the cigar lighter in circuit-opening position shortly after the energizing current has been fed through the heating element and the latter brought up to incandescence. The igniting unit in this figure is ready for removal and use.

Fig. 5 is a transverse sectional view taken on line 5—5 of Fig. 3.

As shown, the improved quick-acting cigar lighter of

2

this invention comprises an igniting unit generally designated by the numeral 10, adapted to be removably carried on a holding device indicated in general by the numeral 11.

The igniting unit 10 comprises a knob portion 12 having a threaded stud 13 which is screwed into a cylindrical insulating body 14 having at its inner or back end a relatively deep, central recess 15. The body 14 is carried in a metal shell or cup 16 which has an out-turned lip or flange 17 engageable with the front of the holding device 11 for the purpose of positioning the igniting unit thereon. The cup 16 has inwardly lanced fingers 18 adjacent the lip 17, said fingers being accommodated in recesses 19 in the body 14 for the purpose of retaining the latter in the cup.

Attached to the exterior of the back or bottom of the cup 16 is a heating coil assembly designated generally by the numeral 20, said assembly comprising a shallow metal cup 21 containing a spiral-wound heating coil 22 of flat metal ribbon. The outer end 23 of the coil 22 is attached to the side walls of the cup 21 as shown in Fig. 3 to provide for conduction of current to the coil. The inner end 24 of the coil 22 is secured to a headed rivet 25 which passes through the bottom of the cup 16 and is headed over on the inside thereof. The shallow cup 21 and heating coil 22 are insulatedly secured to the cup 16 and body 14 by the rivet 25 and the usual insulating washers as shown.

As shown in Figs. 1 and 3 the side walls of the cup 16 are inwardly formed to provide a shallow annular groove or trough 26 which is adapted to accommodate a spring finger 27 provided on the holding device 11, for the purpose of yieldably holding the igniting unit in its deep position on the holder, shown in Figs. 1, 3 and 4.

The holding device 11 comprises a tubular shell 28 having a transverse rear wall or closure 29 and having an out-turned lip or flange 30 adapted to engage the front surface of the supporting panel 31 around an aperture 32 through which the shell 28 extends. A clamping sleeve 33 surrounds the shell 28 and engages the rear surface of the panel 31 to clamp the shell thereto, said sleeve and shell having coengaging screw-threaded portions 34 and 35 as shown.

In accordance with the present invention the heating coil 22 has appreciable mass and low resistance, to draw a heavy current, and novel and improved means are provided for effecting a circuit control by which the coil 22 may be very quickly and yet safely brought up to incandescence without danger of overheating, thus placing the igniting unit quickly in condition for use. This circuit control means is responsive to certain movements of the igniting unit 10, and is also responsive directly to the heating effect of the energizing current, such heating effect resulting in opening of the energizing circuit at the proper instant to provide full incandescence of the coil 22 and yet prevent overenergization of the coil which might result in damage and ultimate burn-out.

In accomplishing this, referring to Fig. 3, I provide within the shell 28 an electric switch 36 comprising a stationary contact 37 carried by a screw 38 which passes through insulating washers 39 and 40 clamped by the screw to opposite sides of the rear wall 29 of the shell 28. Cooperable with the stationary contact 37 is a movable contact 41 carried by an arm 42 whose upper end 43 has a pivotal connection with the lip 44 of a metal shell 45 secured under a shoulder 46 of the washer 39.

The arm 42 extends diametrically across the open end of the shell 45, and at its lower extremity has a rearwardly offset portion 47 provided with a depending finger 48 which is receivable in an opening 49 in the lower side wall of the shell. The movable contact 41

3

is normally maintained separated from the contact 37, as shown in Fig. 4, by a helical compression spring 50 contained within the shell 45 and engaging both the arm 42 and the insulating washer 39. Engagement of the finger 43 with a lower lip portion 51 of the shell 45 limits the separating movement of the contact, as shown.

Also secured to the transverse wall 29 of the holding device shell 28 is a tubular inner sleeve 52 having at its foremost end a plurality of resilient contact fingers 53 arranged to engage and grip the exterior peripheral surface of the heating element cup 21. For the purpose of actuating the movable contact 41 against the action of the spring 50, a switch-actuator means is provided within the sleeve 52, said means comprising a cup-shaped slide member 54 having a front or bottom wall 55 arranged for engagement with the lip of the heating element cup 21. The sleeve 52 has fingers 56 lanced inwardly, engageable with the lip or edge 57 of the slide 54 to limit movement of the slide from left to right. The slide 54 is also keyed against turning by the provision of a slot 58 in its side wall, receiving an inturned finger 59 lanced from the inner sleeve 52.

Mounted on the inner bottom surface of the cup 54 is a toggle 60 comprising an arm 61 pivoted on the slide and a second arm 62 pivoted to the arm 61 and having a transverse pin 63 received in a nesting portion 64 of an actuator arm 65 the upper end 66 of which has a slot 67 receiving an inwardly lanced finger 68 by which the arm 65 is pivotally mounted within the sleeve 52. The arm 65 carries a projection or button 69 which is engageable with the movable contact 41 whereby the latter may be shifted against the action of the spring 50 into circuit-closing engagement with the stationary contact 37.

A coiled torsion spring 70 normally urges the toggle arm 61 clockwise, tending to align the toggle arms 61 and 62, and in this connection the arm 61 has a stop portion 71 which prevents downward breaking of the toggle and only permits the toggle to be broken in an upward direction, as shown in Fig. 4.

The lower lip portion 51 of the shell 45 has fastened to it a thermostatic, bimetallic arm 72 having an up-turned end 73 engageable with the toggle arm 62, and a flexible electrical lead 74 is connected to said up-turned end 73 and to the bottom wall 55 of the slide or cup 54. The arrangement of the bimetallic arm 72 is such that it carries the full energizing current which passes through the heating coil 22, and since this current is of appreciable value the heating effect of it will cause a flexing of the bimetallic arm 72 simultaneously with heating of the coil 22 to incandescence. I rely upon this action to open the energizing circuit quickly and at the proper time after the igniting has been actuated to cause energization of the coil.

Operation of the improved, quick-acting cigar lighter of this invention is as follows: Referring to Fig. 1, the igniting unit 10 is shown as being in a deep, inoperative position on the holding device 11. The toggle 60 is broken upward, and the spring 50 is separating the contacts 37 and 41, thereby maintaining the energizing circuit open. The bimetallic arm 72 is cool and extends straight forward from its supporting shell 45. When it is desired to energize the lighter, the igniting unit 10 is pulled forward to a position such as that shown in Fig. 2. This permits the slide 54 to shift forward or to the left as viewed in Fig. 2, and enables the torsion spring 70 to straighten the toggle 60. The igniting unit 10 is then depressed or moved back again to its deep position on the holder, as shown in Fig. 3. This causes the toggle 60 and actuator arm 65 to shift the movable contact 41 to the right, into engagement with the stationary contact 37.

The energizing circuit is now completed, and current will flow from the terminal screw 38 through the con-

4

tacts 37 and 41, through the shell 45 and bimetallic arm 72 and flexible lead 74 to the slide 54. This slide engages the rim of the heating element cup 21 and accordingly the current will flow by this path to the cup. Also, the slide 54, being carried by and in contact with the spring fingers 53, will conduct current thereto, and from the fingers 53 the current will flow to the heating element cup 21. Accordingly, in the specific embodiment illustrated herein, the elements 53 and 54 which engage the cup 21 for conducting current to the coil 22 may be referred to as conducting means. The energizing current will then flow through the spiral heating coil 22, through the rivet 25 and igniting unit cup 16 to the shell 28 of the holding device. From the shell 28 the current will flow through the supporting panel 31 to the return side of the battery or other source of supply.

As above mentioned, the heating coil 22 is formed of relatively few turns of heavy wire, and accordingly it will draw a very heavy energizing current and will quickly become fully heated or incandescent in a matter of two to four seconds. At the same time, the heavy energizing current passing through the bimetallic arm 72 will cause a rapid heating of said arm, and under the effect of such heating the arm 72 will flex upward as shown in Fig. 4. This will break the toggle 60 and enable the compression spring 50 to quickly and suddenly separate the movable contact 41 from the stationary contact 37. Thus the energizing circuit will be broken, whereupon the igniting unit 10 may be removed from use.

I have found that by the above organization the heating coil 22 will be quickly, properly energized and brought into incandescence and will retain its heat for the length of time necessary for the user to obtain a light for his cigarette, cigar or pipe as the case may be. Moreover, since dependence is not had upon transmission of heat from the heating coil 22 to the thermostat 72, but since the thermostat is heated by the same current which heats the coil there will be no lag in the response of the thermostat under varying conditions of use, and the thermostat will unfailingly respond quickly and promptly to prevent burnout of the coil 22. If, as with other prior lighters, a lag of time were injected into the operation of the lighter, between the heating of the coil 22 and the thermostat 72, the appreciably large energizing current could quickly damage or burn out the coil. However, this cannot happen by the present invention since the heating medium i. e., the energizing current, acts simultaneously on both the heating coil and the thermostatic arm.

After the igniting unit 10 has been removed from the holding device 11 and used, it is replaced on the holding device in the deep position shown in Fig. 1. The toggle 60, however, will not have had time to become straight or aligned since the bimetallic arm 72 in retaining its heat for an appreciable time effectively prevents such straightening. Accordingly, the movement of the igniting unit 10 to the deep position will result in the toggle 60 remaining broken, and the action of the torque spring 70 will not be sufficient to overcome the action of the compression spring 50 which maintains the contacts 41 and 37 separated. Therefore the circuit will remain open until the energizing cycle as above described is repeated.

The above construction provides a further advantage in that it has an inherent safety feature which eliminates the necessity for fusing the lighter. If, through some circumstance, the heating coil 22 should become short-circuited, the result of movement of the igniting unit 10 to energizing position would be merely to cause an accelerated heating of the bimetallic arm 72. This would quickly break the energizing circuit, and such circuit would not be again automatically closed except by action on the part of the operator. Accordingly, the current

5

supply or source for the cigar lighter would be protected and would not suffer damage.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. An electric cigar lighter comprising a holding socket and an igniting plug having a heating coil removable from the socket for igniting tobacco; and means providing an energizing circuit for conducting heating current through said coil, said means including engageable contacts which are separable to open the circuit mounted in the socket, conducting means engageable with the igniting plug for conducting current to the coil, and a metal, heat-responsive member mounted in the socket for automatically separating said contacts when it becomes heated, said member carrying the full heating current of said circuit and being heated thereby simultaneously with the heating coil whereby the circuit may be opened before the coil becomes overheated and in which the heat-responsive member comprises a bimetallic arm having a portion anchored to the socket and a movable extremity operatively associated with one of said contacts, and in which there is a flexible lead secured to said extremity and included in the energizing circuit.

2. The invention as defined in claim 1 in which the anchored portion of the arm is electrically connected to said one contact and the flexible lead is connected between the conducting means and the movable extremity of the arm.

3. An electric cigar lighter comprising a heating coil; and means providing an energizing circuit for conducting heating current through said coil, said means including engageable contacts which are separable to open the circuit, and including a metal, heat-responsive member for automatically separating said contacts when it becomes heated, said member carrying the full heating current of said circuit and being heated thereby simultaneously with the heating coil whereby the circuit may be opened before the coil becomes overheated; and in which there is clip means for conducting current to said heating coil and spring means normally tending to separate the contacts, in which there is an abutment holding the contacts in engagement, and in which the heat-responsive member renders inoperative the said abutment, to effect separation of the contacts.

4. An electric cigar lighter comprising a holding device; an igniting unit including a heating coil assembly, carried for storage on the holding device and removable therefrom for use, said unit being movable on the holding device between shallow and deep positions; an energizing circuit for the heating coil assembly, including a switch normally biased to open position; switch-closing means actuated in response to movement of the igniting unit from shallow to deep position, for closing said switch and for maintaining the switch closed; and heat-responsive current-carrying means in said circuit, responding by heating to the energizing current for rendering said switch-closing means inoperative even though the igniting unit remains in its deep position whereby the switch opens after a predetermined period of energization of the heating coil; and in which the switch is on the holding device, and in which the switch-closing means includes a toggle joint and a slide both on the holding device and operatively connected together, said slide being engageable by the igniting unit and said toggle being engageable by the heat-responsive means; and in which the heat-responsive means comprises a bimetallic arm having an anchorage portion secured to the holding device, and in which the slide comprises a shield separating said arm from the heating coil and minimizing transmission of heat from the coil to said arm.

5. An electric cigar lighter comprising a holding device; an igniting unit including a heating coil assembly, carried for storage on the holding device and removable there-

6

from for use, said unit being movable on the holding device between shallow and deep positions; an energizing circuit for the heating coil assembly, including a switch normally biased to open position; switch-closing means actuated in response to movement of the igniting unit from shallow to deep position, for closing said switch and for maintaining the switch closed; and heat-responsive current-carrying means in said circuit, responding by heating to the energizing current for rendering said switch-closing means inoperative even though the igniting unit remains in its deep position whereby the switch opens after a predetermined period of energization of the heating coil; and in which there is a shield carried by the holding device separating said heat-responsive means from the heating coil of the igniting unit when the latter is on the holding device, and minimizing transmission of heat from the coil to said means.

6. The invention as defined in claim 3 in which the abutment includes a toggle joint which is broken by the heat-responsive member, and in which the spring means further breaks the toggle and causes a sudden and quick separation of the contacts.

7. An electric cigar lighter comprising a holding socket; an igniting unit including a heating coil assembly, carried for storage on the holding device and removable therefrom for use, said unit being movable on the holding device between shallow and deep positions; an energizing circuit for the heating coil assembly, including a switch normally biased to open position; switch-closing means actuated in response to movement of the igniting unit from shallow to deep position, for closing said switch and for maintaining the switch closed; conducting means engageable with the igniting unit and heat-responsive current-carrying means in said circuit, responding by heating to the energizing current for rendering said switch-closing means inoperative even though the igniting unit remains in its deep position whereby the switch opens after a predetermined period of energization of the heating coil, said switch, switch-closing means, conducting means and heat-responsive current-carrying means being mounted in said socket.

8. The invention as defined in claim 7 in which there is spring means for automatically rendering the switch-closing means operative when the heat-responsive means becomes cooled and the igniting unit is in shallow position.

9. The invention as defined in claim 8 in which the igniting unit when in deep position prevents said spring means from being operative to render the switch-closing means operative when the heat-responsive means is hot.

10. The invention as defined in claim 7 in which the switch-closing means includes a toggle joint and a slide both on the holding device and operatively connected together, said slide being engageable by the igniting unit and said toggle being engageable by the heat-responsive means.

11. The invention as defined in claim 4 in which the switch comprises stationary and movable cooperable contacts, in which there is a spring normally urging said contacts apart, in which the anchorage portion of the bimetallic arm is electrically connected to the movable contact, said arm having a portion remote from its anchorage portion, electrically and movably connected to the slide, and in which there are contact arms engageable with the heating coil assembly, constituting a guide for the slide.

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